Microwave-enhanced extraction and mass spectrometry fingerprints of polyphenolic constituents in *Sesamum indicum*leaves

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ABSTRACT

Sesamum indicum is an important commodity plant that is highly valued for its distinctive flavor, nutritional and medicinal function. The polyphenolic constituents in sesame leaves is responsible for its numerous medicinal and nutritional properties. Unfortunately, the extraction of bioactive constituents and their inherent physicochemical characterization is rarely investigated using optimum condition of extraction. In this study, sesame leaves were extracted and optimized using microwave radiation and orthogonal design, respectively. The result from the parametric study gave an optimum condition at 2 min of microwave radiation, 600 W of microwave power, and 80% of ethanol concentration. Under this condition, the optimal yield of the phenolic was 132 (mg GAE/g d.w.). The micro-pores and cavities on the scanning electron micrograph of the residue confirmed the morphological changes as a result of the applied electromagnetic radiation. The appearance of four phenolic functional groups indicated the potential of the extracts for medicinal and nutritional purposes. Moreover, the overall in-vitro free-radical biological assays further confirmed that the phenolic compounds present in the extract were markedly responsible for myriads of medicinal functions. The study, therefore, presented a better understanding of parameters effects on the total recovery of polyphenolic constituents from *S. indicum* leaves with their free-radical scavenging physiochemical characteristic which could form a basis for future applications in pharmaceutical industries.

KEYWORDS:
Characterization; Microwave reflux extraction; Sesamum indicum; Taguchi optimization; Total phenolic content (TPC)